

CLAIMS:

1. A pre-label receiver sheet comprising in order
 - (a) a pragmatic pre-label sheet comprising:
 - (i) a polymeric image-receiving layer;
 - 5 (ii) a pragmatic polymer film, either a multi-layer or single layer film, comprising a microvoided layer, in a continuous phase, a polylactic-acid-based material, the microvoided layer having a void volume of at least 25 percent by volume,
 - (b) a pressure-sensitive adhesive layer; and
 - (c) a carrier sheet such that the pressure-sensitive adhesive layer is
- 10 releasably covered with the carrier sheet in peelable adhesion.
2. The sheet of claim 1 wherein the microvoided layer further comprises void initiating particles used to form microvoids in the microvoided layer.
- 15 3. The sheet of claim 1 wherein the pragmatic polymer film is extruded as a single layer.
4. The sheet of claim 2 wherein the particles having a particle
- 20 size of less than 5 μm .
5. The sheet of claim 1 wherein said microvoided layer is biaxially oriented.
- 25 6. The sheet of claim 1 wherein said pragmatic pre-label sheet has a thickness of from about 25 to about 400 μm .
7. The sheet of claim 1 wherein said polylactic-acid-based material is composed of at least 75% by weight of poly(L-lactic acid).

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8. The sheet of claim 2 wherein the particles are inorganic and make up from about 25 to about 75 weight % of the total weight of the microvoided layer.
- 5 9. The sheet of claim 2 wherein the particles are organic and comprise from about 10 to about 45 weight % of the total weight of the microvoided layer.
- 10 10. The sheet of claim 1 wherein said polylactic-acid-based material is a mixture of at least 90% poly(L-lactic acid) and at least 1% poly(D-lactic acid).
11. The sheet of claim 8 wherein the inorganic particles are present in an amount between 35 to 65 weight %.
- 15 12. The sheet of claim 8 wherein the inorganic particles are selected from the group consisting of barium sulfate, calcium carbonate, zinc sulfide, zinc oxide, titanium dioxide, silica, alumina, and combinations thereof.
- 20 13. The sheet of claim 12 wherein the inorganic particles have an average size from 0.3 to 2.0 μm .
14. The sheet of claim 1 wherein the pragmatic polymer film is multi-layer composite film.
- 25 15. The sheet of claim 14 wherein the pragmatic polymer film comprises a second layer comprising a voided or non-voided polylactic-acid-based material and is adjacent to and integral with the microvoided layer.

16. The sheet of claim 15 wherein the pragmatic polymer film comprises a third layer that is microvoided with the second layer between the microvoided first and third layers.

5 17. The sheet of claim 16 wherein the microvoided first and third layers consist of the same material and the second layer is non-voided.

10 18. The sheet of claim 1 wherein the polylactic-acid-based material comprises additional polymers or blends of other polyesters.

19. The sheet of claim 1 wherein the carrier sheet is laminated to the pragmatic pre-label sheet so that a front surface of the carrier sheet faces a back surface of the pragmatic pre-label sheet.

15 20. The sheet of claim 1 wherein at least one pragmatic-label portion is formed in the pragmatic pre-label sheet by cutting a shape through the pragmatic pre-label sheet but not through the carrier sheet.

21. The sheet of claim 1 wherein the image-receiving layer comprises a polyester material.

20 22. The sheet of claim 1 wherein the pragmatic polymer film further comprises a coextruded second layer in addition to the microvoided layer, the microvoided layer having a top side and a bottom side, wherein the coextruded second layer is on the bottom side of the microvoided layer and the image-receiving layer is on the top side of the microvoided layer.

25 23. The sheet of claim 1 wherein the pragmatic pre-label sheet consists essentially of only coextruded biaxially stretched layers above the pressure-sensitive adhesive layer.

24. The sheet of claim 1 wherein the pragmatic pre-label sheet consists essentially of an image-receiving layer and the pragmatic polymer film.

25. The sheet of claim 1 wherein the carrier sheet comprises
5 more than one layer.

26. The sheet of claim 1 further comprises at least one image in the image-receiving layer formed by imagewise thermal dye transfer.

10 27. The sheet of claim 1 wherein cutting lines are formed at least partially through the pragmatic pre-label sheet to form a label sheet, so to allow peeling of at least one pragmatic label portion comprising a portioned (a) imaged image-receiving layer, (b) substrate, and (c) bottom pressure-sensitive adhesive layer, wherein the substrate consists of all the layers, including a
15 portioned (i) pragmatic polymer film and (ii) optional intermediate sheet, between the image-receiving layer and the bottom pressure-sensitive adhesive layer.

28. The sheet of claim 27 wherein the label sheet comprises a plurality of pragmatic-label portions and cutting lines are formed around and
20 through each pragmatic-label portion but substantially not in or through the carrier sheet.

29. The sheet of claim 28 wherein multiple pragmatic-label portions in the label sheet are formed by sectioning the label sheet into a plurality
25 of frames each forming a separable pragmatic label.

30. The sheet of claim 26 wherein the at least one image has a print density of at least 1.5.

31. The sheet of claim 1 wherein the microvoided layer comprises, in a continuous phase, polylactic-acid-based material having dispersed

therein void initiators selected from the group consisting of crosslinked organic microbeads, inorganic particles, non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material, and combinations thereof.

32. The sheet of claim 1 wherein the microvoided layer comprises, in a continuous phase, polylactic-acid-based material having dispersed therein a blend of inorganic and non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material.

33. The sheet of claim 32 wherein the ratio of the volume of inorganic to the volume of the non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material is from 4:1 to 1:4.

34. The sheet of claim 1 wherein the pragmatic polymer film comprises a core layer comprised of a non-voided polylactic-acid-based material or a polylactic-acid-based material voided with non-crosslinked polymer particles.

35. The sheet of claim 31 wherein the non-crosslinked polymer particles that are immiscible with the polylactic-acid-based material have an olefinic backbone.

36. The sheet of claim 1 wherein the microvoided layer has a thickness from 20 to 150 micrometers.

37. The sheet of claim 1 wherein the image-receiving layer comprises a polymeric binder containing a polyester and/or polycarbonate.

38. The sheet of claim 1 wherein the pragmatic pre-label sheet is imaged with a thermal-dye-transfer process including imaging with fiducial marks having a density of greater than 0.5.

39. The sheet of claim 1 wherein the carrier sheet comprises exposed edges having a width of less than 20 mm.

40. The sheet of claim 1 wherein the carrier sheet has a stiffness
5 of between 15 and 60 milliNewtons.

41. A thermal-dye-transfer assemblage comprising a dye-donor element, and the pre-label sheet of claim 1.

10 42. A process for making a pre-label sheet comprising a pragmatic pre-label sheet and a carrier sheet, which pragmatic pre-label sheet comprises, in order, a polymeric image-receiving layer, a pragmatic polymer film, and a bottom pressure-sensitive adhesive layer, which process comprises the following steps:

15 (a) providing a pragmatic pre-label sheet by the following steps:

(i) blending void-initiating particles into a first melt comprising a polylactic-acid-based material,

(ii) coextruding or extruding the first melt to form a cast single-layer or multi-layer film comprising at least one layer made from the first
20 melt;

(iii) stretching the cast film biaxially to reduce its thickness and to form microvoids around the particles, thereby obtaining an oriented stretched film;

(iv) applying an intermediate sheet, comprising one or
25 more layers, to a back surface of the oriented stretched film;

(v) applying a pressure-sensitive adhesive layer, or a laminate comprising a pressure-sensitive adhesive layer, to at least a portion of the back surface of the oriented stretched film, on a side opposite the image-receiving layer, to form a pre-label receiver sheet or, when an intermediate sheet is present,
30 to at least a portion of the back surface of the intermediate sheet; and

(vi) applying an image-receiving layer to the pragmatic polymer film either by coextruding the image-receiving layer with the pragmatic polymer film or by solvent coating the image-receiving layer on the pragmatic polymer film; and

- 5 (b) providing the pre-label sheet with a carrier sheet such that the adhesive layer of the pre-label sheet is releasably covered with the carrier sheet in peelable adhesion.

43. A process for making a pre-label receiver sheet comprising
10 a pragmatic pre-label sheet and a carrier sheet, which pragmatic pre-label sheet comprises, in order, a polymeric image-receiving layer, a pragmatic polymer film, and an adhesive layer, which process comprises the following steps:

(a) providing a pragmatic pre-label sheet by the following steps:

- (i) blending void-initiating particles into a first melt
15 comprising a polylactic-acid-based material,
(ii) co-extruding a second melt for a polymeric image-receiving layer with one or more other melts for forming a single-layer or multiple-layer pragmatic polymer film, wherein the one or more other melts includes the first melt for forming a microvoidable layer, thereby forming a co-
20 extruded cast composite film comprising at least the image-receiving layer and the microvoidable layer;

(iii) stretching in at least one direction the cast composite film to reduce the thickness of the composite film and to produce an oriented stretched composite film, wherein the image-receiving layer is less than 15
25 micrometers thick;

(iv) optionally applying an intermediate sheet, comprising one or more layers, to a back surface of the oriented stretched composite film; and

(v) applying a pressure-sensitive adhesive layer, or a laminate comprising a pressure-sensitive adhesive layer, to at least a portion of the
30 back surface side of the oriented stretched composite film, on a side opposite the

image-receiving layer, or when an intermediate sheet is present, to at least a portion of the back surface of the intermediate sheet; and

- (b) providing the pre-label sheet with a carrier sheet such that the adhesive layer of the pre-label sheet is releasably covered with the carrier sheet in peelable adhesion.

44. The process of claim 42 wherein the carrier sheet is laminated to the pragmatic pre-label sheet so that a front surface of the carrier sheet faces the back surface of the pragmatic pre-label sheet.

45. The process of claim 42 wherein the microvoided layer comprises, in a continuous phase, a polylactic-acid based material having dispersed therein void initiators selected from the group consisting of crosslinked organic microbeads, inorganic particles, non-crosslinked polymer particles that are immiscible with the polylactic-acid based material, and combinations thereof, the microvoided layer has a void volume of at least 25 percent by volume.

46. The process of claim 42 wherein the microvoided layer comprises, in a continuous phase, a polylactic-acid based material having dispersed therein a mixture of either crosslinked organic microbeads or inorganic particles in combination with non-crosslinked polymer particles that are immiscible with the polylactic-acid based material, the layer having a void volume of at least 25 percent by volume.

47. The process of claim 42 wherein the pragmatic polymer film further comprises a coextruded second layer on a side of the microvoided layer opposite the image-receiving layer which third layer comprises of a voided or non-voided material.

48. The process of claim 47 further comprising a coextruded third layer on a side of the second layer opposite the microvoided layer which

third layer comprises of a microvoided material wherein the coextruded third layer comprises poly(lactic acid).

49. The process of claim 42 wherein the microvoided layer has
5 a void volume of from 25 to 65 volume percent.

50. A label made from the pre-label sheet of claim 1 that can be adhesively applied to an objective object.